

A systematic review on the role of beta adrenergic antagonists in diabetic foot ulcer

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ABSTRACT:

Diabetic foot ulcers are a constant threat to diabetic patients and can lead to amputations and even death. Beta antagonists have found to improve ulcer healing by inhibiting catecholamine effects such as keratin migration and wound epithelialization. The aim of this study is to review the available research articles on the usage of beta adrenergic antagonists in ulcer healing. A systematic search on PubMed database was carried out to review articles investigating the role of beta adrenergic antagonists on diabetic ulcer healing. Out of 133 records identified through electronic database search, finally 9 studies were included in the systematic review. The findings revealed that beta adrenergic antagonists such as timolol and propranolol as a topical cream accelerate ulcer healing process by enhancing anti-inflammatory and pro-angiogenic mechanisms.

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INTRODUCTION

Diabetic foot ulcers are a constant threat to diabetic patients and can lead to amputations and even death. Beta antagonists have found to improve ulcer healing by inhibiting catecholamine effects such as keratin migration and wound epithelialization. The aim of this study is to review the available research articles on the usage of beta adrenergic antagonists in ulcer healing.

MATERIALS AND METHODS

A systematic search on PubMed database was carried out to review articles investigating the role of beta adrenergic antagonists on diabetic ulcer healing. The combinations used were 'Diabetic foot ulcer' OR 'Diabetic wound healing' OR 'Diabetic Ulcer' AND 'beta adrenergic antagonist' OR 'beta blockers'. Articles which directly assess usage of beta adrenergic antagonists in diabetic ulcer were included. Articles that were not in English language, not relevant to our study, review articles, case reports, erratum and commentary were excluded. The preparation of the article is based on the PRISMA checklist and guidelines.

RESULTS

The results were shown in Figure 1 and Table 1.

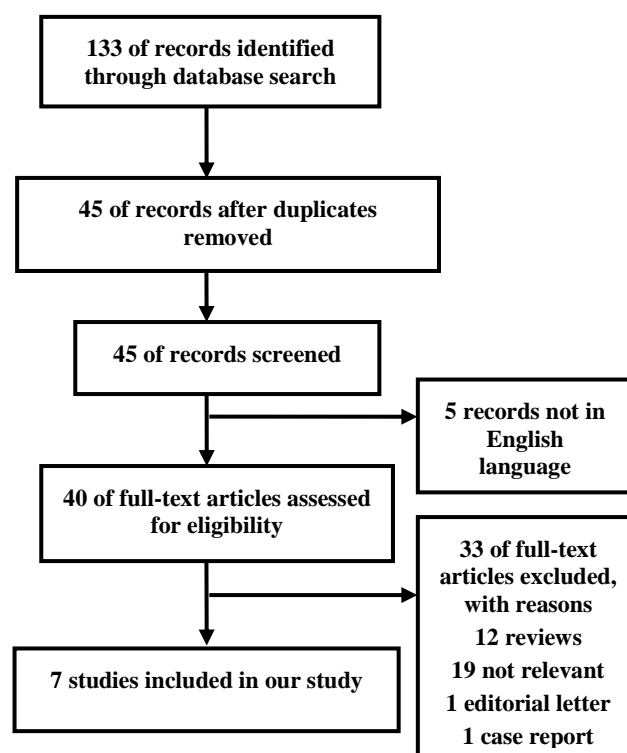


Figure 1: PRISMA flowchart showing the selection process of studies included in our study.

DISCUSSION

The findings revealed that beta adrenergic antagonists such as timolol and propranolol as a topical cream accelerate ulcer healing process by enhancing anti-inflammatory and pro-angiogenic

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mechanisms. In conclusion, beta adrenergic antagonists in ulcer healing may be useful in the treatment of diabetic foot ulceration. Despite the limited number of studies, this study will provide new insights into the future clinical trials in diabetic foot ulcer healing.

Table 1: Main finding of the studies included in our study.

Ref. No	Author, Year.	Study Design	Main Findings
1	Chang et al. 2019	Animal model	Propranolol accelerates the healing of chronic diabetic wounds.
2	Yang et al. 2020	Animal model	Combination of hypoxia and timolol with MSC demonstrated to promote wound healing in diabetic mice.
3	Zheng et al. 2017	Animal model	Clinical application of topical propranolol cream promotes wound healing in spontaneously diabetic mice. diabetic mice.
4	Gulcan et al. 2012	Animal model	Cream containing 5% and 10% neбиволol had beneficial effects on wound healing
5	Romana-Souza et al. 2009	Animal model (Case-control)	Propranolol-treated hyperglycemic animals presented reduced wound areas and greater cell proliferation compared to control hyperglycemic animals
6	Fox et al. 2016	Human model (cohort study)	No significant association between diabetic ulcer healing and use of beta blockers.
7	Thomas et al. 2017	Human model (Prospective observational study)	Venous and diabetic leg ulcer healing rates were significantly better at 4, 8, and 12 weeks in the 30 patients who received topical timolol in addition to conventional management than in the 30 patients who received conventional treatment alone.

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Declaration of Competing Interest

None

Peer-Review

The manuscript has been reviewed by

1. Dr. Raghavan KS, Assistant Professor, Madurai Medical College, Madurai.
2. Dr. Raja M, Consultant Physician and Diabetologist, CM Speciality Hospital, Namakkal.

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Author Contribution Statement

Both authors contributed equally to the manuscript and approved it.

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